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BIRCH STEWART KOLASCH & BIRCH
PO BOX 747
FALLS CHURCH, VA 22040-0747

EXAMINER	
LUCAS, ZACHARIAH	
ART UNIT	**PAPER NUMBER**
1648	

DATE MAILED: 06/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/367,052	KISHIMOTO ET AL.	
	Examiner	Art Unit	
	Zachariah Lucas	1648	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *13, 16, 22, 24-35* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *13, 16, 22, 24-35* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Status of the Claims

1. Currently, claims 13, 16, 22, 24-35 are pending in the application.

2. In the prior action, mailed on September 24, 2003, claims 1-5, 10-12, 16, and 22 were rejected; and claims 6-9, 14, 15, 17-21, and 23 were withdrawn as to non-elected inventions. In the Responses (both the Response of March 24, 2004, and the Supplemental Response of April 9, 2004), the Applicant cancelled claims 1-12, 14, 15, 17-21, and 23; amended claims 13, 16, and 22; and added new claims 24-35.

3. Because this action raises issues not raised in the prior action, it is being made Non-Final.

Specification

4. **(Prior Objection- Withdrawn)** The disclosure was objected to in the prior action because, on page 15 lines 17-19, the specification described an amino acid sequence as "encoding the above nucleic acid sequence," rather than being encoded by it. In view of the amendment of the indicated language, the objection is withdrawn.

5. **(Prior Objection-Withdrawn)** The disclosure was objected to because of the following informalities: in many instances where the application refers to a sequence identifier, the application identifies the sequences as "of Sequence Listing." In view of the amendment to the application, the objection is withdrawn.

6. **(New Objection)** The disclosure is objected to because of the following informalities: In the sections of the specification amended in response to the second objection above (pages 10-12, 18-20, 22-23, 28, 41-44, and 46-50), while the Applicant has removed the language objected to in the prior action, the amendments to the specification have not incorporated the changes to the sequence listing as were made to the specification in the Preliminary Amendment of August 6, 1999. Because of this, the discussions of the sequences in the amended specification are not in accordance with the sequences of the current sequence listing. I.e., the specification appears to be misidentifying the sequences being discussed. Appropriate correction is required.

Claim Objections

7. **(Prior Objection- Withdrawn)** Claims 1-4 were objected to because of the following informalities: each of these claims, when referring to a SEQ ID NO:, continues, after identifying the sequence number, "of Sequence listing." In view of the cancellation of these claims, the objection is withdrawn.

8. **(Prior Objection- Withdrawn)** Claim 13 was objected to because of the following informalities: This claim reads on a method of producing a polypeptide by culturing a cell "under condition capable of expressing the expression vector according to claims 10." In view of the amendment of the claim, the objection is withdrawn.

9. **(Prior Objection- Withdrawn)** Claim 13 was objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim should refer to other claims in the alternative only. See MPEP § 608.01(n). In view of the amendment of the claim such that it is now in independent form, the objection is withdrawn.

Claim Rejections - 35 USC § 112

10. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

11. **(Prior Rejection-Withdrawn)** Claims 1-5, 10-12, 16, and 22 were rejected in the prior action under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claims were rejected because it was unclear if the claims required the presence of DNAs comprising the full length of SEQ ID NO: 1, or encoding the full length of SEQ ID NO: 2; or if the claims included embodiments wherein only a fragment of such DNAs were present. In view of the cancellation of claims 1-5, and 10-15, the rejection of these claims is withdrawn as moot. The rejection of claims 16 and 22 is withdrawn because the claims have been drafted such that the claim language clearly includes both the full length, and fragments of, the indicated sequences.

12. **(Prior Rejection-Withdrawn)** Claim 5 was rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It was unclear what conditions were included by the term "stringent" in the claim. In view of the cancellation of claim 5, and the amendment of the pending claims, the rejection is withdrawn.

13. **(New Rejection)** Claims 13, 16, 22, 24, 25, 27-35 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the

subject matter which applicant regards as the invention. These claims read on methods of producing or DNAs encoding a polypeptide of SEQ ID NO: 2 or a derivative thereof, wherein the polypeptide has "an activity of a receptor capable of binding to a murine PBSF/SDF-1." It is not clear what the full scope of the claims are as the Applicant has provided only two examples of activities performed by such a polypeptide (binding to murine PBSF/SDF-1, and acting as a binding site for T-cell-line-tropic HIV-1 env cell membrane fusion with a T-cell-line-tropic HIV-1). There is no indication as to what other activities these proteins may perform. It is further noted that the claims are not limited to activities performed by the native protein encoded by SEQ ID NO: 1, but to any activity of any receptor that binds murine PBSF/SDF-1. Because it is not clear what other activities may be performed by the indicated polypeptides, the claims are rejected for indefiniteness.

14. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

15. **(Prior Rejection- Restated and Maintained)** Claims 1-5, 10-12, 16, and 22 were rejected in the prior action under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In view of the cancellation of claims 1-5, and 10-12, the rejection is withdrawn from these claims.

The rejection is maintained over claims 16, and 22, and expanded to amended claim 13, and new claims 24-27, 29, 31, 32, 34, and 35.

The Applicant traverses the rejection on two grounds. First, they argue that the specification does provide examples of fragments of SEQ ID NO: 1. Second, the Applicant argues that those in the art would be able to determine what modifications may be made to the sequences from the combined teachings in the specification that the polypeptide encoded by SEQ ID NO: 5 has the ability to bind murine PBSF/SDF-1, and the indications on page 7 of the specification as to what region of the human receptor are thought necessary for binding activity. These arguments are persuasive to the extent that the claims are directed to methods wherein the activity required is limited to PBSF/SDF-1 binding and the polypeptide comprises at least the sequence of SEQ ID NO: 6 (the polypeptide encoded by SEQ ID NO: 5). However, none of the claims are limited to such polypeptides.

These claims read on a genus of inventions comprising the nucleic acid of SEQ ID NO: 1, or fragments or derivatives (DNAs with a substitution, deletion, insertion, or addition in comparison to the sequence of SEQ ID NO: 1) thereof encoding a polypeptide having "an activity of a receptor capable of binding to a murine PBSF/SDF-1." As was described in the prior action, the Applicant has demonstrated that the polypeptides encoded by SEQ ID NO: 1 have the ability to bind murine PBSF/SDF-1 and to permit cell membrane fusion mediated by T-cell-line-tropic HIV-1 env. Thus, the Applicant has provided descriptive support for a genus of DNAs encoding the polypeptide encoded by SEQ ID NO: 1. Further, as was described above, the Applicant has also provided descriptive support for DNA sequences, or fragments of SEQ ID

NO: 1, that encode at least the polypeptide encoded by SEQ ID NO: 5 and that have the function of PBSF/SDF-1 binding.

However, the Applicant has not disclosed any fragments or variants of the encoded polypeptide, or of SEQ ID NO: 1 encoding for such fragments, that are also disclosed as able to perform *any activity* of a receptor capable of binding to a murine PBSF/SDF-1. Rather, the teachings of the specification are limited to the two categories of polypeptides described above. While the Applicant agrees with the Applicant's assertion that they have disclosed fragments of SEQ ID NO: 1 (i.e. SEQ ID NOs: 3, 5, and 7), there is no indication that each of these polypeptides would be capable of performing any one of the activities of the whole receptor encoded by SEQ ID NO: 1. There is no indication in the specification as to what, if any, other functions of the full length protein encoded by SEQ ID NO: 1 the polypeptides encoded by these fragments are able to perform (with the exception of the polypeptide encoded by SEQ ID NO: 5, shown to have murine PBSF/SDF-1 binding activity). It is noted that the Applicant has shown that the protein encoded by the receptor gene (pages 55-58, esp. page 55 , lines 10-15- indicating that the full length gene was used in the cell fusion assay) has the ability to permit cell membrane fusion mediated by T-cell-line-tropic HIV-1 env. However, there is no demonstration as to which fragments may be able to perform this function, or which residues within the polypeptide sequence are required for the function.

Further, as was described in the new indefiniteness rejection above, the Applicant has provided only two examples of activities performed by "a receptor capable of binding to a murine PBSF/SDF-1." The Applicant has neither provided examples or any indication as to what other activities the receptor may perform. As the Applicant has not demonstrated what other

functions the polypeptides may perform, not provided any guidance as to what structures are required for such other activities, the Applicant has not provided adequate written description support for any fragment of SEQ ID NO: 1 encoding any polypeptide capable of performing any activity of the encoded protein.

Because the Applicant has neither provided adequate written description support for any fragment of SEQ ID NO: 1 encoding a polypeptide capable of performing any activity of the murine CXCR4 receptor, or for any fragment capable of binding murine PBSF/SDF-1 not comprising a fragment of SEQ ID NO: 1 encoding at least the polypeptide encoded by SEQ ID NO: 5, the Applicant has not provided adequate written description support for the full scope of the claimed inventions.

16. **(Prior Rejection- Restated and Maintained)** Claims 1-5, 10-12, 16, and 22 were rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for compositions comprising the full sequence of SEQ ID NO: 1, does not reasonably provide enablement for embodiments comprising only fragments of or comprising derivatives of the sequence that encode polypeptide capable of binding to murine PBSF/SDF-1. This rejection is withdrawn from cancelled claims 1-5, and 10-12, and extended to amended or new claims 13, 24-27, 29, 31, 32, 34, and 35.

The Applicant traverses the rejection on the grounds that each of the polypeptides encoded by SEQ ID NOs: 3, 5, and 7 are "examples of nucleotide sequences which retain the function of encoding a protein which binds murine PBSF/SDF-1." However, while the Examiner agrees that the specification demonstrates that the polypeptide encoded by SEQ ID NO: 5 has

this activity, the Applicant has not demonstrated that the polypeptides encoded by either of SEQ ID NOs: 3 or 7 also have this activity. Further, it is also noted that the claims are not, as was suggested in the prior action, limited to DNAs encoding polypeptides with the ability to bind murine PBSF/SDF-1, but are in fact broadly claiming DNAs encoding polypeptides with any activity of "a receptor capable of binding murine PBSF/SDF-1." This language includes not only the activity of the native protein encoded by SEQ ID NO: 1, but also the activity of any protein with the ability to bind murine PBSF/SDF-1.

The teachings of the present application have been described above, and in the prior action. As was described above, the Applicant has provided written description support for two genera of inventions, 1) the protein encoded by SEQ ID NO: 1, and 2) polypeptides capable of binding murine PBSF/SDF-1 comprising the amino acid sequence encoded by SEQ ID NO: 5. The Examiner believes that this also comprises the scope of inventions for which the Applicant has provided an enabling disclosure. As was indicated above, the Applicant has neither demonstrated that the polypeptides encoded by either of SEQ ID NOs: 3 or 7 have the ability to bind murine PBSF/SDF-1, nor provided any guidance as to what polypeptides other than the full length protein encoded by SEQ ID NO: 1 have either the ability to permit cell membrane fusion mediated by T-cell-line-tropic HIV-1 env or the ability to perform any other activity of "a receptor capable of binding to a murine PBSF/SDF-1."

While the Applicant argues that each of SEQ ID NOs: 3, 5, and 7 represent fragments of SEQ ID NO: 1, it is noted that SEQ ID NO: 5 is the only fragment which has been shown to perform any activity of the full-length protein. Further, even the polypeptide encoded by SEQ ID NO: 5 has been shown to possess only one of the potential activities of the receptor.

In view of the breadth of the claims, the limited guidance and examples provided in the application, and the unpredictability in the art (described in the prior action), the rejection is maintained for the reasons above and the reasons of record.

17. **(Prior Rejection- Maintained)** Claim 5 was rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement The claim read on a DNA capable of hybridizing under stringent conditions to a DNA encoding a polypeptide that binds to PBSF/SDF-1, and that simultaneously encodes for a polypeptide having the activity of binding to such a polypeptide. Although claim 5 has been cancelled, the rejected subject matter has been incorporated in pending claims 12, 16, 22, 31, 34, and 35. See e.g., Claim 13, part (e). The rejection is therefore maintained against these claims. The rejection is maintained because a first nucleic acid that hybridizes to a second nucleic acid does not encode the same polypeptide as the second nucleic acid. Rather, the first nucleic acid would be complement of a nucleic acid with that encodes the polypeptide.

18. **(Prior Rejection-Maintained in part)** Claim 22 was rejected under 35 U.S.C. 112, first paragraph, because the specification, while potentially being enabling for a kit for the detection of HIV-1 infection comprising a cell transfected with a polynucleotide encoding CXCR-4 and CD4, does not reasonably provide enablement for a kit for the detection of the onset of AIDS, or for kits for detecting HIV infection wherein the cells express CD4, and only a portion of the CXCR-4 receptor that binds to murine PBSF/SDF-1. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make

or use the invention commensurate in scope with these claims. The claim is rejected on two grounds. First, the Applicant has not established that the claimed kit (or method of using it) would be capable of determining the onset of AIDS. Second, the Applicant has not established that the kit could be used wherein cells of the kit do not comprise the full murine CXCR-4.

With respect to the first ground of rejection, the Applicant has amended the claims clarify that the kit is useful for diagnoses infection by T-cell-line-tropic HIV-1, and not the onset of AIDS. In view of this amendment, and the arguments made pursuant thereto, this part of the rejection is withdrawn.

However, the second grounds of rejection is maintained over claim 22, and extended to new claims 26, 32, and 34. The rejection is also extended to amended claim 35, which reads on a method involving the use of cells with a similar activity as that required for the performance of the cells in claims 22, 26, 32, and 34. The Applicant traverses this portion of the rejection by arguing that each of SEQ ID NOs: 3, 5, and 7 represent nucleic acids encoding polypeptides that bind murine PBSF/SDF-1. This argument is not found persuasive for several reasons. For example, the specification neither demonstrates that the ability to bind murine PBSF/SDF-1 is demonstrative of the ability to bind or be useful for the detection of HIV-1. Further, even if it is assumed that the two functions are indicative one of the other, the specification also does not teach that each of the polypeptides encoded by SEQ ID NOs: 3, 5, and 7 are able to bind PBSF/SDF-1. In particular, as was described above, the Applicant appears to have demonstrated only the utility of the full-length protein in the HIV-1 detection kit, and has demonstrated only that the fragment encoded by SEQ ID NO: 5 is capable of PBSF/SDF-1 binding.

It is also noted that the claims are not limited to polypeptides with any specific activity of the protein encoded SEQ ID NO: 1, or even limited to activities of that protein. As was described above, the claims are drawn to polypeptides with any activity of any receptor that can bind murine PBSF/SDF-1. Thus, the claims are broadly drawn to any fragment or variant of SEQ ID NO: 1 that encoded a polypeptide with any of an unknown set of activities. In view of this breadth, the limited guidance as to what residues or sequences are required for any particular function, the lack of teachings as to what sequences, structures, or residues are required for efficacy in the claimed methods, and the unpredictability in the art, the rejection is maintained against the indicated claims for the reasons above and the reasons of record.

19. **(Prior Rejection-Withdrawn)** Claim 22 was also rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for kits comprising the cell recombinantly expressing hCD4 and mCXCR-4, does not reasonably provide enablement for HIV detection kits comprising any cell that expresses human CD4 (hCD4) and murine CXCR-4 (mCXCR-4). The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make or use the invention commensurate in scope with these claims.

In view of the amendment of the claim such that it now reads on the detection of only T-cell-line-tropic HIV-1, and requires that both the hCD4 and mCXCR-4 are heterologous to the recombinant cell, the rejection is withdrawn.

20. **(New Rejection)** Claims 16, 25, 29, and 30 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for cells recombinantly expressing hCD4 and mCXCR-4 that may be infected with T-cell-line-tropic HIV, does not reasonably provide enablement for any cell expressing hCD4 and mCXCR-4 and which may be infected by any HIV when contacted therewith. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make or use the invention commensurate in scope with these claims. The claims read on recombinant cells comprising human CD4 and a polypeptide encoded by one of the indicated polynucleotides, wherein the polypeptide has the activity of a receptor that binds murine PBSF/SDF-1, and wherein the cells are subject to infection by HIV upon contact with the virus.

These claims are rejected for substantially the same reasons as indicated in the prior action with reference to claim 22. See, prior action, paragraph 17, pages 12-13. I.e., while the Applicant has shown that certain HIV-1 virus may be able to infect cells expressing heterologous hCD4 and mCXCR-4, the art indicates that not all cells expressing hCD4 and mCXCR-4 are subject to such infection. See e.g., Heesen et al. (J Immunol, supra). As indicated by this reference, and reaffirmed by the teachings of Bienasz et al. (J Virol 71(9): 7097-100), many cells expressing homogenous mCXCR-4 were not able to fuse with cells expressing HIV env proteins or were not permissive to HIV infection. However, Bieniasz also discloses, as does the present Applicant, that cells transfected to express the heterologous hCD4 and mCXCR-4 receptors were permissive to binding and infection by certain strains of HIV. Page 7097. Thus, the Applicant is not enabled for any cells that express hCD4 and mCXCR-4, but does appear to be enabled for cells that express the receptors exogenously. Further, as both the art (Bieniasz, paragraph

spanning pages 7097-98, and page 7099), and the application (pages 59-60, esp. page 60, lines 15-19), indicate that some viruses, but not others, are capable of binding and infecting cells with hCD4 and mCXCR-4, the Applicant is not enabled for claims allowing for infection by HIV. Rather, the specification is enabling only for T-cell-line-tropic strains of HIV-1.

21. **(New Rejection)** Claim 35 rejected is under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. This claim reads on methods of producing a polypeptide having "an activity of a receptor capable of binding to a murine PBSF/SDF-1" through expression of a vector encoding such polypeptide in a recombinant cell, wherein the "polypeptide supports cell membrane fusion mediated by a T-cell-line-tropic HIV-env and infection with a T-cell-line-tropic HIV-1." This claim is rejected for two reasons.

First, the Applicant has not provided enabling support for recombinant cells expressing only CXCR-4 that are subject to T-cell-line-tropic HIV-env mediated cell-membrane fusion or infection by T-cell-line-tropic HIV-1. Both the specification and the art clearly indicate that the presence of both CD4 and CXCR-4 are required for such fusion or infection to occur. Thus, the Applicant is not enabled for the claimed methods to the extent that they read on the use of cells with the function as described in claim 35, but which do not also comprise heterologous human CD4.

The claim is also rejected for the reasons indicated with reference to claims 16, 25, 29, and 30 in paragraph 20 above. I.e., the Applicant has not demonstrated that any cell which expresses both hCD4 and murine CXCR-4 would have the indicated functional activities.

Claim Rejections - 35 USC § 102

22. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

23. **(Prior Rejection-Maintained)** Claims 1, 3, 10-12, and 16 were rejected under 35 U.S.C. 102(a) as being anticipated by Nagasawa et al., PNAS 93: 14725-29 (of record in the IDS of August 6, 1999). The reference discloses the isolation of DNA encoding for the murine CXCR-4 receptor, and the cloning and transfection of CHO cells therewith. See, pages 14726-28. Thus, the reference teaches the currently claimed invention. Claims 1, 3, and 10-12 have been cancelled from the application. The rejection is therefore withdrawn from these claims. However, the rejection is extended to claims 13, 24, 25, 27-30, and 35.

Claim 16 has been amended such that the claim now adds the language "wherein said recombinant cell is infected with HIV when contacted therewith." The Applicant argues in traversal of the rejection of amended claim 16 that, because Nagasawa teaches that the cells disclosed therein are subject to infection by HIV, the reference fails to anticipate the claimed cells. This argument is not found persuasive. This is because the Applicant has not demonstrated how the claimed cells differ structurally from those of the reference. The Claims read on any

recombinant cell comprising both hCD4 and mCXCR-4 or a variant thereof. Such cells are disclosed by Nagasawa. See page 14729. While the claims include functional language which are not, according to the teachings of the reference, met by the disclosed cells, the Applicant has not demonstrated that the cells of the reference are structurally distinct from those of the claims. Because the prior art cells meet the structural limitations of the claims, they would inherently have all of the functional characteristics of the claimed cells. Thus, because the cells of the prior art meet the structural limitations of the claimed cells, and because such cells would inherently meet the functional limitations of the claims, the Applicant's argument in traversal of the rejection of claim 16 is not found persuasive. The rejection is therefore maintained against claim 16, and extended to claims 25, 29, and 30 which depend from claim 16, and the structural limitations of which are also disclosed by the Nagasawa reference.

Amended claim 13, and it dependant claims 24, 27, and 28, describe methods for the production of a murine CXCR-4, including embodiments wherein the cell comprises the sequence of SEQ ID NO: 1, and the CXCR-4 protein has the sequence of SEQ ID NO: 2. As indicated in the prior action, Nagasawa teaches the transformation of cells with such DNA such that the receptor is expressed in the cells. The rejection is therefore extended to and maintained against these claims.

24. **(Prior Rejection-Maintained in part)** Claims 16 and 22 were rejected under 35 U.S.C. 102(a) as being anticipated by either of Heesen et al. (supra), or Ashorn et al., J Virol 64: 2149-56. These claims read on a cell expressing the receptor encoded by the polynucleotide of claim 1, and a CD4 receptor.

The Applicant traverses the rejection on the same grounds as were addressed above with reference to the rejection over Nagasawa (i.e., the art denies that the disclosed cells meet the functional limitations of the claims). The traversal is not found persuasive for the reasons also described above. The rejection is therefore maintained with respect to claim 16, and extended to new or amended claims 13, 24, 25, 28, 30, and 35.

Claim 22 has now been amended such that it requires that the hCD4 and mCXCR-4 expressed by the claimed cells are heterologous to the cells. Such is not the case in the Heesen or Ashorn references, as in each case one of the receptors was native to the recombinant cell. Further, because the references teach that the recombinant cells were not able to bind to virus, there would have been no motivation from these references to create a cell comprising both receptors wherein the receptors are heterologous to the cell.

Claim Rejections - 35 USC § 103

25. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

26. **(Prior Rejection-Withdrawn)** Claims 1, 3, 10, 11, and 12 are rejected under 35 U.S.C. 103(a) as obvious over Heesen et al. (J Immunol, supra). In view of the cancellation of these claims, the rejection is withdrawn.

Conclusion

27. No claims are allowed.

28. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zachariah Lucas whose telephone number is 571-272-0905. The examiner can normally be reached on Monday-Friday, 8 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Housel can be reached on 571-272-0902. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Z. Lucas
Patent Examiner

JAMES HOUSEL 6/13/04
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1600